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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/073,763

02/11/2002

Markus P. Hehlen

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12/20/2006

GEMFIRE c/o HAYNES BEFFEL & WOLFELD LLP

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EXAMINER

LEE, JOHN D

ART UNIT

PAPER NUMBER

2874

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/20/2006

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/073,763

Applicant(s)

HEHLEN ET AL.

Examiner

John D. Lee

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-30 is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-16 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20060511.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

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Applicant's petition to revive having been granted (see the decision mailed on October 30, 2006), prosecution is resumed in this application.

A request for continued examination under 37 CFR § 1.114, including the fee set forth in 37 CFR § 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR § 1.114, and the fee set forth in 37 CFR § 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR § 1.114. Applicant's submission filed on May 11, 2006, has been entered.

Claim 6 is objected to because of the following minor informality: it is believed that this claim should depend from claim 5 rather than from claim 1, since there is otherwise no antecedent support for "said first taper section". Appropriate correction is required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 8-10, and 12 are rejected under 35 U.S.C. § 102(e) as being clearly anticipated by U.S. Patent 6,270,261 to Kawano. Kawano discloses a semiconductor optical isolator device which, though the word "integrated" is not used in the description, is certainly an integrated structure (see column 5, lines 30-31). The Kawano isolator device comprises a planar optical (upper) substrate formed on a planar lower substrate **7**. An optical waveguide core is formed in the planar optical (upper) substrate and has an input section **5b** and an output section **5a**. A trench is formed in the planar optical (upper) substrate, the trench being oriented transversely with respect to a longitudinal axis of the waveguide core, the trench receiving and holding a passive isolator element **2** which is positioned in the optical path of the waveguide core between the input section and the output section. The isolator element **2** allows the passage of light traveling in one direction but inhibits the passage of light traveling in the opposite direction. Column 6 (lines 47-49) of Kawano clearly states that the input waveguide section and the output waveguide section are a single optical waveguide which is divided by the trench. This means that the input section **5b** and the output section **5a** are formed simultaneously. The Kawano isolator element **2** comprises a Faraday rotator layer interposed between birefringent (polarizing) layers – see column 3, lines 66-67. It can be clearly seen that a long axis of the isolator element **2** is oriented perpendicularly to an optical axis of the waveguide **5a**, **5b**. Since the trench extends fully through the planar optical (upper) substrate **50a**, **50b**, it meets the claim limitation

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of extending "partially" through the thickness of such substrate. The Kawano trench also extends partially into the thickness of lower substrate 7.

Claims 5-7, 11, and 13-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,270,261 to Kawano. There are no illustrated taper portions for either of the waveguide sections in the Kawano isolator device. It is well known in the art, however, that the use of "expanded tapered" waveguide cores facilitate coupling of light therebetween by imposing less stringent requirements on necessary alignment precision. It is also known that the use of such "expanded tapered" waveguide cores results in transferral of light from one mode size to another. Because any waveguide-to-waveguide coupling arrangement would benefit from less stringent alignment tolerances between the waveguide cores, it would have been obvious to the person of ordinary skill to utilize this well-known prior art technique in the isolator device of Kawano. The dimensions of the Kawano waveguide elements are not given in the reference. Because most single-mode waveguide cores are of a diameter of at most a few microns, and because it is known that the core must be well confined within the surrounding cladding, it would have been obvious to require that the center of the cores **5a** and **5b** in Kawano be at least 30 microns below the upper major surface of the substrates **50a**, **50b**. Only ordinary skill in the art would be involved. As mentioned earlier, the Kawano device is made of a semiconductor material such as quartz, with the waveguide cores being formed by doping the material appropriately (see column 3, lines 36-42). Since quartz is considered a glass-like material, it would certainly have been obvious to form the Kawano substrates **50a**, **50b** from glass. The use of well-

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known doping techniques, such as field assisted ion-exchange, to form the waveguide cores, would likewise have been obvious. Although a single waveguide is divided to form the Kawano input and output waveguides discussed above, the formation of these two waveguides separately as first and second pieces (as in applicant's claims 15-16) would have been an obvious modification, since no structural differences would result.

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Kawano, the closest prior art of record, does not disclose or suggest an embodiment wherein a plural number of waveguides are simultaneously divided by a single optical isolator element.

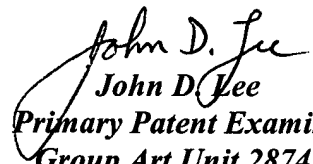
Claims 17-30 are allowed. As noted above, Kawano, the closest prior art of record, does not disclose or suggest an embodiment wherein a plural number of waveguides are simultaneously divided by a single optical isolator element.

The three (3) prior art documents listed in the Information Disclosure Statement filed along with the Request for Continued Examination on May 11, 2006, have been considered and made of record. Note the attached initialed copy of form PTO-1449. These documents are not considered to be as pertinent as the U.S. Patent to Kawano relied on in the rejections above.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to

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the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.


John D. Lee
Primary Patent Examiner
Group Art Unit 2874